



# **Fargo Maestro 100**

# **Fargo Maestro 100**

# **Fargo Maestro 20**

*Lite*

**GSM GPRS Modem**

**900 / 1800**

**Value Added Feature**

**USER MANUAL**



# Fargo Telecom Asia Ltd.

## Revision history

Rev.	Date	Details	Originated by
0.9	22July 2005	First release	Wallace Lee
0.91	22Feb 2006	- Remove AT command history feature - Remote AT command : when enabled all incoming SMS will be erased	Wallace Lee
0.92	21Apr 2006	AutoTCP/UDP : Add DCD/DSR signaling : modify command/data mode switching	Wallace Lee
0.94	3OCT2006	Support Fargo Maestro 100 Lite New Feature : AT command driven TCP/UDP connection Call screening VAF AT commands can be sent over SMS	Wallace Lee

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## 1. INTRODUCTION

Fargo Maestro Value-Added Feature (VAF) package is a software solution for Fargo Maestro modem (\*note 1). New functions added to increase application range of various industrial and automated applications:

- Automatic and self-recovery TCP/UDP socket connection (\*note 2)
- AT command driven TCP/UDP socket connection (\*note 2)
- Remote AT command (AT command through SMS)
- I/O triggered AT command execution
- Call screening (reject call made by unauthorized phone number)

Users can configure and use the above features by AT commands.

*Note 1: Not all Fargo Maestro can have this feature installed. Please refer to Chapter 2*

*Note 2: For Fargo Maestro 100 with TCP/IP and Fargo Maestro 100 Lite only*

## 2. INSTALLATION

### 2.1. Identifying your Fargo Maestro

Not all Fargo Maestro can have the Value-added feature installed, so you need to check your Fargo Maestro modem before installation.

#### 2.1.1. Identifying Fargo Maestro by AT command

Start HyperTerminal, choose correct baud rate to communicate with the modem

(Fargo Maestro 20/100Lite: 9600bps, 8N1; Fargo Maestro 100: 115200bps, 8N1 )

Then enter the following and see the response according to the following table:

Model	Command	Expected response
Fargo Maestro 20	AT+WOPEN=2	+WOPEN: 2,"AT v02.10"
Fargo Maestro 100	AT+WOPEN=2	+WOPEN: 2,"AT v02.10","AT v02.10"
Fargo Maestro 100 Lite	AT+WOPEN=2	+WOPEN: 2,"AT v03.01"

If you get the same response then this modem is ready for installation.

### 2.2. Installing the Value added feature

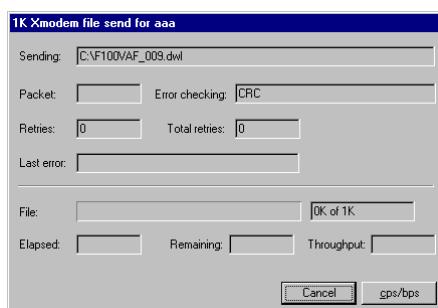
#### 2.2.1. Erasing the IP connectivity feature (AT# feature) (Fargo Maestro 100 only)

For Fargo Maestro 100, you need to erase the IP connectivity feature before downloading the Value added feature. Again, on HyperTerminal enter the following commands step by steps:

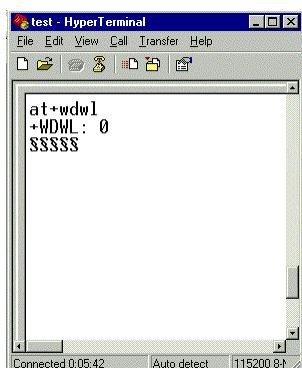
Command entered	Expected response
AT+WOPEN=0	(modem will reset)
AT+WOPEN=3	OK
AT+WOPEN=4	(modem will reset)

## 2.2.2. Downloading the file

- a. Check the HyperTerminal is configured with setting “8 data bits, no parity, 1 stop bit, and hardware flow control (CTS/RTS)
- b. For Fargo Maestro 20 and Fargo Maestro 100 Lite, it is suggested to set the baud he RS232 link is changed to 115200 bps. You can first start HyperTerminal session with 9600 bps. The on the screen type command AT+IPR = 115200 and then press “Enter”. Then change the HyperTerminal speed to 115200bps. (For Fargo Maestro 100 the default speed is 115200bps)
- c. On the screen type the command AT+WDWL and then press “Enter”. The modem should answer +WDWL: 0, and then a series of strange characters appear or the cursor is just moving forward slowly. (the modem is sending the first characters of the Xmodem protocol).
- d. Then on HyperTerminal you choose “Transfer” –“Send File”



- e. When you see the dialog box, on the “Filename” you choose file according to the modem:



Fargo Maestro 20 : FM20\_VAF\_094\_OAT210\_16.dwl

Fargo Maestro 100 : FM100\_VAF\_094\_OAT210\_32.dwl

Fargo Maestro 100 : FM100\_VAF\_094\_OAT303\_32.dwl

Then on “Protocol” choose “Xmodem”, then press “OK”

Then the downloading process will start:

- f. After finishing downloading enter command AT+CFUN=1 to restart modem
- g. After restarting enter command AT+WOPEN=1 to start the VAF program (modem will restart).



h. Enter VAF version command **AT+VAFV** to verify :

Command	Expected response
AT+VAFV	FM100_VAF_094_OAT210_32 Sep 28 200618:01:42 OK

Now the Fargo Maestro Value added Feature installation has been done. You can follow other chapters to use the features.

## 3. GPRS AND TCP/UDP PARAMETERS SETUP

**Note: This chapter does not applicable to Fargo Maestro 20**

The Automatic and AT command driven TCP/UDP connection (described in Chapter 4 and 5) requires GPRS connection and TCP / UDP parameters setup. This chapter will describe those required setups.

### 3.1. GPRS Network Parameters

User need to enter the following parameters for GPRS connection:

- Access point name (APN)
- User name
- Password

They are to be entered by using **AT+IPGPRS** command. Contact your network operator for these parameters.

#### 3.1.1. AT+IPGPRS command

**Description:**

This command is used to setup GPRS network parameters for the TCP/UDP connection feature.

#### Command Syntax

AT+IPGPRS=<cid>,<APN>,<UN>,<PW>

#### Response Syntax

+IPGPRS: <cid>,<APN>,<UN>,<PW>

Command	Possible responses:
AT+IPGPRS?	+IPGPRS: 1,"INTERNET", "", "" OK <i>Note: show current settings</i>
AT+IPGPRS=1,	OK <i>Note: set Cid value to 1</i>
AT+IPGPRS=1,"INTERNET"	OK <i>Note: set the PDP value to 1 and APN to "INTERNET"</i>
AT+IPGPRS=?	+IPGPRS: (1-4),(100),(50),(50) OK <i>Note: possible values</i>

**Defined Values :**

**<cid>**

PDP context identifier.

Note: to use with VAF TCP/UDP connection feature this value must be set to 1.

**<APN>**

Access point name of the GPRS network. Max 100 characters.

**<UN>**

User name to access the GPRS service. Max 50 characters.

**<PW>**

Password used to access the GPRS service. Max 50 characters.

## 3.2. Activating GPRS Connection

For using AT command driven TCP/UDP connection (described in Chapter 5), you need to first activate the VAF GPRS connection. There are two AT commands:

- **AT+CGATT**
- **AT+IPCONNECT**

### 3.2.1. AT+CGATT command

This standard AT command is to make the modem to attach to or detach GPRS network. For details please read AT command document.

#### Command Syntax

AT+CGATT=<state>

#### Response Syntax

+CGATT: <state>

Command	Possible responses:
AT+ CGATT?	+CGATT: 0 OK <i>Note: display current status</i>
AT+ CGATT=1	OK <i>Note: GPRS attach success</i>
AT+ CGATT =0	OK <i>Note: GPRS detach success</i>

#### Defined Values:

<state>

1: attach GPRS

0: detach GPRS.

### 3.2.2. AT+IPCONNECT command

This VAF AT commands is to make the modem to activate or deactivate GPRS connection . Once IPCONNECT is success you can perform TCP/UDP connection as described on other chapters. Please read note below on using this command.

#### Command Syntax

AT+IPCONNECT = <Bearer>,<Connect>

#### Response Syntax

+IPCONNECT: <Bearer>,<Connect>

Command	Possible responses:
AT+IPCONNECT=?	+IPCONNECT: (0-1) , (0-1) OK <i>Note: display possible values</i>
AT+IPCONNECT?	+IPCONNECT: 1,0 OK <i>Note: display current status</i>
AT+IPCONNECT=1,1	OK OK OK <i>Note: Activate GPRS connection success</i>
AT+IPCONNECT=1,1	+CME ERROR: 3 <i>Note: Activate GPRS connection fail</i>
AT+IPCONNECT =1,0	OK <i>Note: Deactivate GPRS connection success</i>

#### Defined Values:

##### <Bearer>

0: using GSM Bearer ( **Note: do NOT use this for VAF** )  
 1: using GPRS Bearer.

##### <Connect>

0: to stop connection  
 1: to start connection.

**Note:** Before you making GPRS connection by this command make sure you have finished the following first:

1. Entered APN settings by AT+IPGPRS command Chapter 3.1.1)
2. Attached to GPRS network by AT+CGATT command (Chapter 3.2.1)

It is suggested after modem power up wait about 20 seconds before making GPRS connection.

### 3.3. TCP/UDP Parameters Setup

For using automatic or AT command driven TCP/UDP connection (described in Chapter 4 and 5), you need to first enter the target TCP/UDP peer parameters. There are

- AT+IPTCP
- AT+IPUDP
- AT+IPBUFF
- 

#### 3.3.1. AT+IPTCP command

This command specifies the TCP socket parameters and mode that to be used by automatic or AT command driven TCP connection (described in Chapter 4 and 5).

## Command Syntax

AT+IPTCP=<port>,<mode>,<server>,<TCPTxDelay>

## Response Syntax

+ IPTCP: <port>,<mode>,<server>,<TCPTxDelay>

Command	Possible responses:
AT+ IPTCP?	+IPTCP: 0,"S","",100 OK <i>Note : show current settings</i>
AT+ IPTCP =23	OK <i>Note: set the TCP port to 23</i>
AT+ IPTCP =23,"C",202.144.111.222",100	OK <i>Note: to set the modem to connect TCP socket Client (caller) mode to target :address 202.144.111.222 and port 23</i>
AT+ IPTCP =23,"S",255.255.255.255",100	OK <i>to set the modem to wait for TCP socket connection request (Server (listening) mode) any calling IP address allowed, port 23</i>
AT+ IPTCP =?	+IPTCP: (0-65535),("C","S"),(120),(0-32760) OK <i>Note : possible argument</i>

## Defined Values:

### <port>

The port number to be used for the TCP socket connection. Default value is 0. Valid range is 0 to 65535.

### <mode>

Mode of TCP operation. Default value is "S".

"S" Server (Listening) mode. This configures Fargo Maestro to open a listening TCP connection on the specified <port> . The TCP connection will be active upon getting socket connection request from the allowed remote TCP peer (see <address>)

"C" Client (caller) mode. This configures Fargo Maestro to request opening a TCP connection to the server with the specified <address> and <port> .

**Note:** This parameter is used by Auto TCP connection (see Chapter 4) only.

### <address>

The address of the TCP server (or host). Default value is empty. Legal values could be 32-bit in dotted-decimal notation (i.e. xxx.xxx.xxx.xxx) or alphanumeric ASCII test string up to 120 characters (only if DNS is available on the GPRS network)

**Note:** In "Server" (Listening) mode the modem will only accept TCP connection request for the caller with address specified in the <address> field. Yet if the it is set to "255.255.255.255" the modem will accept request from ANY address.

## <TCPTxDelay>

This parameter determines the time delay introduced before sending a TCP frame that has not been entirely filled with user data. The timer is entered in milliseconds and it should be noted that a value of '0' initiates the sending of a TCP frame as soon as possible after the reception of a single character value from the host.

The default value is 100.

### 3.3.2. AT+IPUDP command

This command specifies the UDP socket parameters and mode that to be used by automatic or AT command driven UDP connection (described in Chapter 4 and 5).<sub>1</sub>

#### Command Syntax

AT+IPUDP=<port>,<mode>,<server>,<UDPTxDelay>

#### Response Syntax

+ IPUDP: <port>,<mode>,<server>,<UDPTxDelay>

Command	Possible responses:
AT+ IPUDP?	+IPUDP: 0,"S","",100 OK <i>Note : show current settings</i>
AT+ IPUDP =23	OK <i>Note: set the UDP port to 23</i>
AT+ IPUDP =23,"C",202.144.111.222",100	OK <i>Note: to set the modem to connect UDP socket Client (caller) mode to target :address 202.144.111.222 and port 23</i>
AT+ IPUDP =23,"S",255.255.255.255",100	OK <i>to set the modem to wait for UDP socket connection request (Server (listening) mode) any calling IP address allowed, port 23</i>
AT+ IPUDP=?	+IPUDP: (0-65535),("C","S"),(120),(0-32760) OK <i>Note : possible argument</i>

#### Defined Values:

##### <port>

The port number to be used for the UDP socket connection. Default value is 0. Valid range is 0 to 65535.

##### <mode>

Mode of UDP operation. Default value is "S".

"S" Server (Listening) mode. This configures Fargo Maestro to open a listening UDP connection on the specified <port> . The UDP connection will be active upon getting socket connection request from the allowed remote UDP peer (see <address>)

"C" Client (caller) mode. This configures Fargo Maestro to request opening a UDP connection to the server with the specified <address> and <port> .

**Note:** This parameter is used by Auto UDP connection (see Chapter 4) only.



## **<address>**

The address of the UDP server (or host). Default value is empty. Legal values could be 32-bit in dotted-decimal notation (i.e. xxx.xxx.xxx.xxx) or alphanumeric ASCII test string up to 120 characters (only if DNS is available on the GPRS network)

**Note:** In “Server” (Listening) mode the modem will only accept UDP connection request for the caller with address specified in the **<address>** field. Yet if it is set to “255.255.255.255” the modem will accept request from ANY address.

## **<UDPTxDelay>**

This parameter determines the time delay introduced before sending a UDP frame that has not been entirely filled with user data. The timer is entered in milliseconds and it should be noted that a value of '0' initiates the sending of a UDP frame as soon as possible after the reception of a single character value from the host.

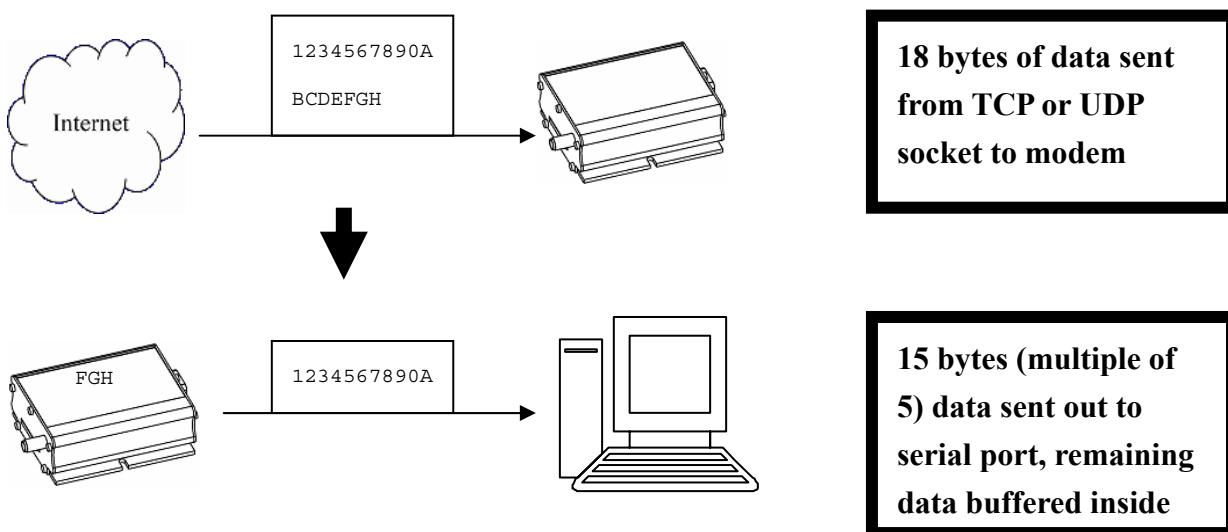
The default value is 100.

### **3.3.3. AT+IPBUFF command**

This command specifies the number of bytes of payload data from remote peer buffered inside the modem when automatic or AT command driven TCP / UDP connection is made.

- If the quantity of buffered data reach this value, the whole buffered data will be sent out to the serial port.
- If the data from remote is large enough at one time, only multiple of this value data will be sent out to the serial port remainder will be kept inside buffer.

Example: **AT+IPBUFF=5**



#### **Command Syntax**

**AT+IPBUFF = <buff>**

#### **Response Syntax**

**+IPBUFF: <buff>**

<b>Command</b>	<b>Possible responses:</b>
----------------	----------------------------

AT+IPBUFF=?	+IPBUFF: 0-100 OK <i>Note: display possible values</i>
AT+IPBUFF?	+IP BUFF: 0 OK <i>Note: display current status</i>
AT+IPBUFF = 5	OK <i>Note: Set IPBUFF value to 5</i>

**Defined Values:**

**<buff>**

The number of bytes of data to be buffered. Default value is 0 (i.e. no buffering). Valid range is 0 to 100.

**Note:** If the TCP or UDP socket connection is broken, buffered data will be lost.

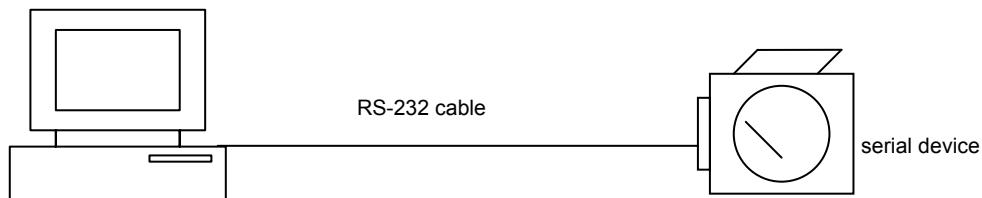
## 4. AUTOMATIC AND SELF-RECOVERY TCP/UDP CONNECTION

***Note: This chapter does not applicable to Fargo Maestro 20***

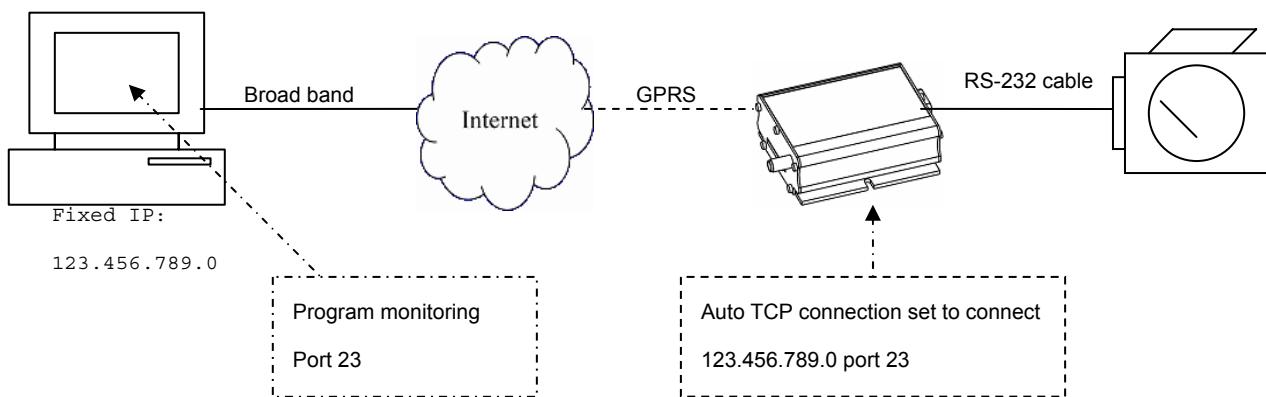
The Auto TCP/UDP connection feature is defined for accessing serial devices over the Internet. Fargo Maestro can be configured that after power up it will connect to a remote TCP/UDP socket (client mode) or to wait for the TCP/UDP socket connection request from remote peer (server mode).

If the socket connection is unsuccessful or disconnected it will repeat the connection request and back to waiting stage. This make remote peer can access serial device connected to Fargo Maestro.

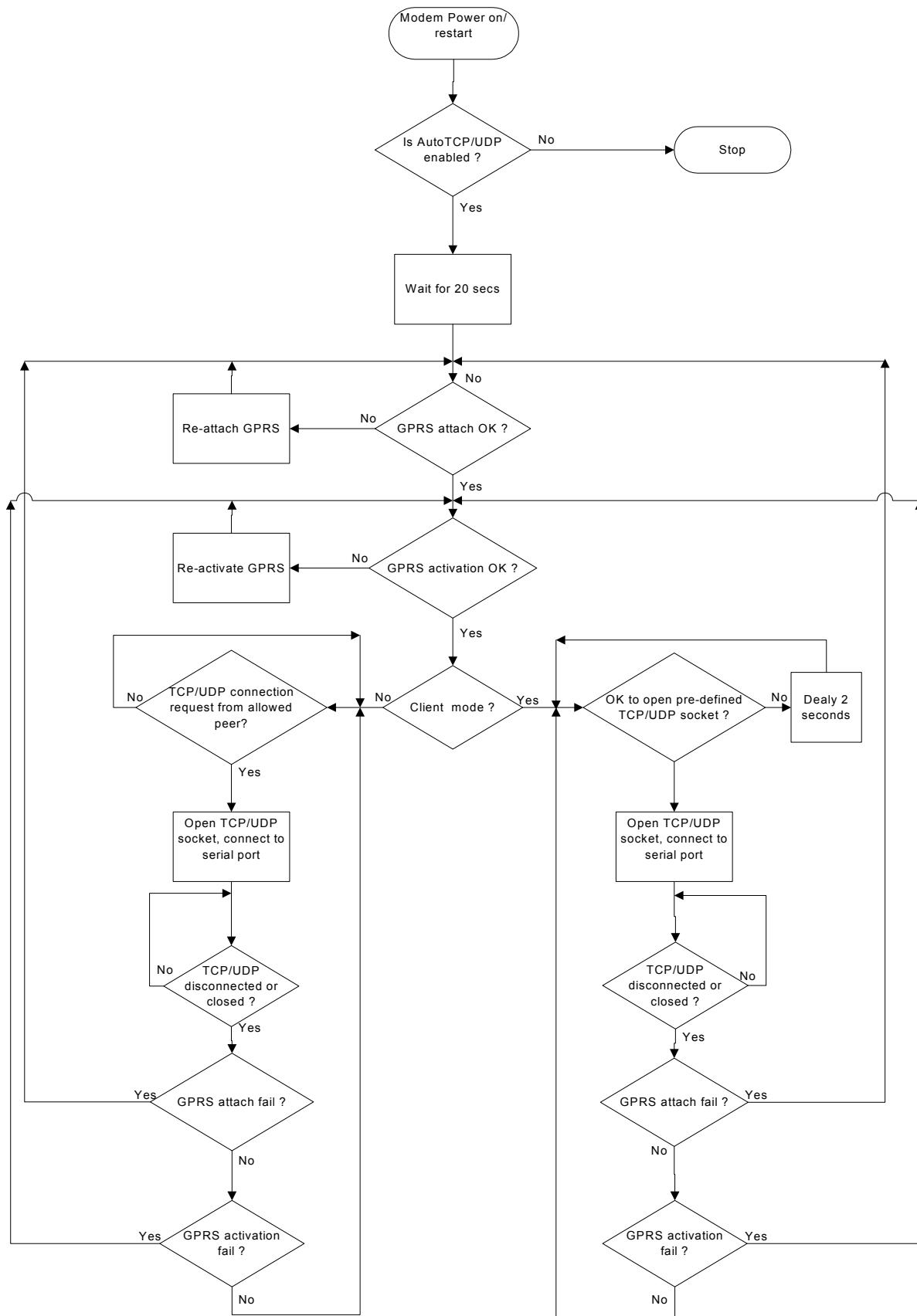
**Direct serial connection**



**TCP Socket connection via the Internet /GPRS network**



#### 4.1. Flow diagram of Auto TCP/UDP connection function



## 4.2. AT commands for Auto TCP/UDP connection

### 4.2.1. AT+AUTOTCP command

This command controls the Maestro 100/100 Lite to start TCP socket connection automatically

Before using **AT+AUTOTCP** TCP and GPRS settings MUST be setup properly using **AT+IPTCP** and **AT+IPGPRS** command respectively.

#### Command Syntax

AT+AUTOTCP=<mode>

#### Response syntax:

+AUTOTCP: <mode>

Command	Possible responses:
AT+AUTOTCP=0	OK <i>Note : disable AutoTCP</i>
AT+AUTOTCP=1	OK <i>Enable AutoTCP</i>
AT+AUTOTCP?	+AUTOTCP : 1 OK <i>Note display current status</i>
AT+AUTOTCP=?	+AUTOTCP : (0-1) <i>Note : possible argument</i>

#### Defined Values:

##### <mode>

- 1 enable auto TCP
- 0 disable auto TCP

##### **Note :**

- Before enabling Auto TCP, it **MUST** be properly set the GPRS settings by **AT+IPGPRS** command and TCP settings by **AT+IPTCP** command (see Chapter 3)
- **ONLY** GPRS PDP context # 1 will be used. So please setup +IPGPRS settings with **<cid>=1**
- Once AutoTCP is enabled, it will start the TCP socket connection automatically after 20 seconds.
- Once the TCP connection is established successfully, the serial port will go to data mode, all data entered to the serial port will be sent to remote TCP peer. No more AT commands will be accepted then.
- In TCP connected data mode, the DSR and DCD signals of the serial port will go to high.
- If the TCP connection is broken the modem will try to reconnect automatically. During re-connection period serial port will go back to command mode, and DSR/DCD signal back to low.
- The setting will be saved, and after power off, the AUTOTCP will be restarted with the 20 seconds delay after power up.
- To stop auto TCP connection, you need to enter the command **AT+AUTOTCP=0** by either 1: within 20 seconds after power up, or 2: during reconnection (serial port back to command mode), or 3: by SMS (see Chapter , SMS AT command).
- Auto TCP connection is exclusive to other TCP/UDP feature. See Chapter 10 (Q&A)

## 4.2.2. AT+AUTOUDP command

This command controls the Maestro 100/100 Lite to start UDPacket connection automatically.

Before using **AT+AUTOUDP** TCP and GPRS settings **MUST** be setup properly using **AT+IPUDP** and **AT+IPGPRS** command respectively.

### Command Syntax

AT+AUTOUDP=<mode>

### Response syntax:

+AUTOUDP: <mode>

Command	Possible responses:
AT+AUTOUDP=0	OK <i>Note : disable AutoUDP</i>
AT+AUTOUDP=1	OK <i>Note: Enable AutoUDP</i>
AT+ AUTOUDP?	+AUTOUDP : 1 OK <i>Note: display current status</i>
AT+AUTOUDP=?	+AUTOUDP : (0-1) <i>Note : possible argument</i>

### Defined Values:

#### <mode>

- 1 enable auto UDP
- 0 disable auto UDP

### Note :

- Before enabling Auto UDP, it **MUST** be properly set the GPRS settings by **AT+IPGPRS** command and UDP settings by **AT+IPUDP** command
- **ONLY** GPRS PDP context # 1 will be used. So please setup +IPGPRS settings with <cid>=1
- Once AutoUDP is enabled, it will start the UDP socket connection automatically after 20 seconds.
- Once the UDP connection is established successfully, the serial port will go to data mode, all data entered to the serial port will be sent to remote UDP peer. No more AT commands will be accepted then.
- In UDP connected data mode, the DSR and DCD signals of the serial port will go to high.
- If the UDP connection is broken the modem will try to reconnect automatically. During re-connection period serial port will go back to command mode, and DSR/DCD signal back to low.
- The setting will be saved, and after power off, the AUTOUDP will be restarted with the 20 seconds delay after power up.
- To stop auto UDP connection, you need to enter the command **AT+AUTOUDP=0** by 1: within 20 seconds after power up, or 2: during reconnection (serial port back to command mode) or 3: by SMS (see Chapter , SMS AT command).
- Auto TCP connection is exclusive to other TCP/UDP feature. See Chapter 10 (Q&A)

- Due to the nature of UDP socket connection, **AT+AUTOUDP=0** may not be able to disconnection. in this case you may send command **AT+IPCONNECT=1,0** to disconnect GPRS connection.

## 5. AT COMMAND DRIVEN TCP/UDP CONNECTION

### **Note: This chapter does not applicable to Fargo Maestro 20**

This feature let user to make a TCP or UDP connection upon the **AT+OTCP** or **AT+OUDP** command.

This socket connection feature do support DLE/ETX character coding. See

The **AT+OTCP** and **AT+OUDP** operation is similar to AT#OTCP and AT#OUDP function provided original IP Connectivity.

See IP connectivity document.

Make sure you have made the GPRS connection by **AT+IPCONNECT** command before making socket connection (see Chapter 11, setup examples).

### **5.1. AT commands for Auto TCP/UDP connection**

#### **5.1.1. AT+DLEMODE command**

When performing the AT command driven TCP or UDP socket connection, the attached host has the choice to code or not the ETX character.

When DLEMODE is set to 0, no specific process is needed on ETX characters. It means that it is not possible for a host to request a end of connection or to receive a clear indication of end of connection from the TCP/IP stack.

When DLEMODE is set to 1, the ETX character means a request or an indication of end of connection.

As a consequence, ETX characters that belongs to the payload data must be sent by the host on the serial port preceded by a DLE

character. Similarly ETX characters received by the TCP/IP stack from the Internet are sent to the host through the serial port preceded by a DLE character

“ETX” is character hex 03, “DLE” character is hex 10 (Dec 16)

Default value is 0.

#### **Command Syntax**

AT+DLEMODE=<mode>

#### **Response syntax:**

+DLEMODE: <mode>

Command	Possible responses:
AT+ DLEMODE =0	OK <i>Note : disable DLEMODE</i>
AT+ DLEMODE =1	OK <i>Note: Enable DLEMODE</i>
AT+ DLEMODE?	+DLEMODE : 1 OK <i>Note: display current status</i>
AT+ DLEMODE =?	+DLEMODE : (0-1) <i>Note : possible argument</i>

## Defined Values:

### <mode>

1 enable DLEMODE

0 disable DLEMODE

### Note :

- DLEMODE is not available for Automatic TCP/UDP connection.

## 5.1.2. AT+OTCP command

This command sent by the attached host to open a TCP connection to the TCP server specified by the **AT+IPCTP** command. If socket connection is made successfully it will response CONNECT 115200 and the serial port will go to data mode, all data entered to the serial port will be sent to remote TCP/UDP peer.

If socket connection is unsuccessful or socket is disconnected afterwards the modem will send out NO CARRIER message and back to command mode.

### Command Syntax

AT+OTCP

### Response syntax:

CONNECT 115200

Command	Possible responses:
AT+OTCP	CONNECT 115200 <i>Note : TCP connection made successfully</i>
AT+OTCP	+CME ERROR 3 <i>Note: fail, either IPCONNECT is not ready or socket service is used already</i>
AT+OTCP	NO CARRIER <i>Note: possibly remote server no response</i>

### Note :

- AT+OTCP connection is exclusive to other TCP feature. See Chapter (Q&A)
- If TCP connection is unsuccessful or broken after connection the GPRS connection will also be disconnected. (+IPCONNECT: 1,0). So please enter AT+IPCONNECT=1,1 to reconnect GPRS before entering AT+OTCP.

## 5.1.3. AT+OUDP command

This command sent by the attached host to open a UDP connection to the UDP server specified by the **AT+IPUDP** command. If socket connection is made successfully it will response CONNECT 115200 and the serial port will go to data mode, all data entered to the serial port will be sent to remote UDP peer.

If socket connection is unsuccessful or socket is disconnected afterwards the modem will send out NO CARRIER message and back to command mode.

## Command Syntax

AT+OTCP

## Response syntax:

CONNECT 115200

Command	Possible responses:
AT+ OUDP	CONNECT 115200 <i>Note : UDP connection made successfully</i>
AT+ OUDP	+CME ERROR 3 <i>Note: fail, either IPCONNECT is not ready or socket service is used already</i>
AT+ OUDP	NO CARRIER <i>Note: possibly remote server no response</i>

## **Note :**

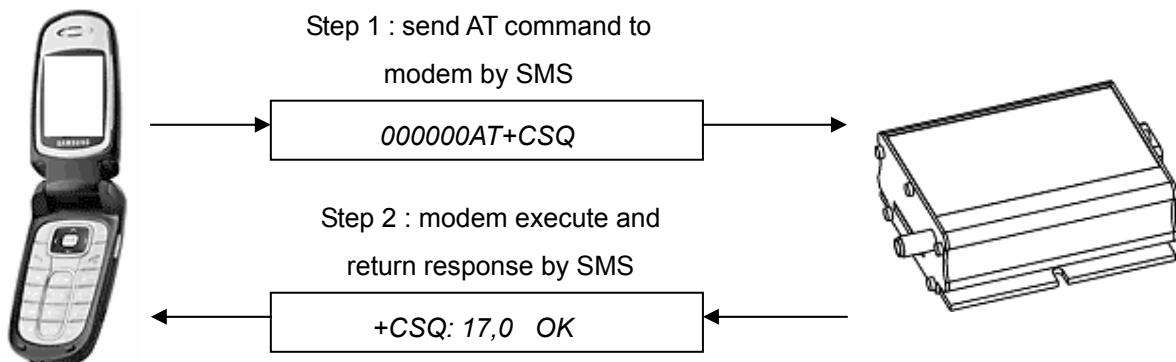
- AT+OUDP connection is exclusive to other TCP/UDP feature. See Chapter (Q&A)
- If UDP connection is unsuccessful or broken after connection the GPRS connection will also be disconnected. (+IPCONNECT: 1,0). So please enter AT+IPCONNECT=1,1 to reconnect GPRS before entering AT+OUDP.
- Due to the nature of UDP socket connection, sending ETX characters (when DLEMODE is 1) may not be able to make disconnection.

## 6. REMOTE AT COMMAND BY SMS

This feature is to control the modem to interpret AT command from incoming SMS, executing it, and return the result to sender by SMS.

The user can enable the modem to receive AT command by incoming SMS. See following about **AT+SMSAT** command.

### 6.1. Description of the Operation



1. When enabled, **the modem will treat the incoming SMS as a source of AT command only if all of the following conditions (a,b and c) are fulfilled :**
  - a. The content of SMS sent to the modem is using standard 7-bit GSM data decoding scheme,
  - b. The first 6 characters of the SMS content matches the <key> parameter set by **AT+SMSAT** command, (default key is "000000")
  - c. The 7<sup>th</sup> and 8<sup>th</sup> characters of the SMS content is "AT" (in capital letters)
2. If SMSAT is enabled , the modem will read each incoming SMS, if the conditions mentioned in 1 are matched the message will be executed, even it is an invalid AT command
3. When using SMSAT feature, only +CNMI:x,1,x,x,x setting could be used (i.e. incoming message will be stored in SIM card).
4. The maximum length of the AT command is limited by length of SMS, i.e. 160-6 = 154 characters
5. When the SMS AT command is executed , all intermediate and final responses will be buffered recorded, then return to the sender's phone number in one single SMS.
6. If response(s) of the AT command is(are) more than 160 characters, only the first 160 characters will be returned.
7. In case the modem cannot get terminal response within 26 seconds, the modem will then abort the command, and return intermediate responses (if present).
8. If the SMSAT feature is enabled, all incoming SMS, either with valid AT command or not, will be erased. This is to prevent SIM card memory from fully filled, such the modem will not receive new SMS.

## 6.2. AT command for configuring AT command

### 6.2.1. AT+SMSAT command

#### Command Syntax

AT+SMSAT=<mode>(<key>)

#### Response syntax:

+SMSAT: <mode>,<key>

Command	Possible responses:
AT+SMSAT=0	OK <i>Note : disable remote AT command by SMS</i>
AT+ SMSAT =1	OK <i>Enable remote AT command by SMS</i>
AT+ SMSAT?	+SMSAT : 1,000000 OK <i>Note display current status</i>
AT+SMSAT=2,123456	OK <i>Note: set the &lt;key&gt; value</i>
AT+ SMSAT =?	+SMSAT : (0-2),(6) OK <i>Note : possible argument</i>

#### Defined Values:

##### <mode>

- 0 disable remote AT command by SMS
- 1 enable remote AT command by SMS
- 2 change the value of the <key>

##### <key>

A 6-digit numeric character key from 000000 to 999999. Only incoming SMS with the first 6 characters matching with this key will be treated as a valid source of remote AT command.

## 6.3. Limitation and caution to be taken when using remote AT command

This feature will not 'judge' the result of executing the command, so care has to be taken not to enter improper command that make the modem becoming out of control:

1. Never send 'interactive' AT command by SMS, e.g. AT+CMGS=.... This feature cannot return the prompt to the sender for second input
2. Always wait for the return SMS with AT responses before you send another SMS AT command.
3. It could be in some case (e.g. network failure) the modem cannot return response SMS. The modem will try sending response SMS for three times max. If still not successful it will abort.

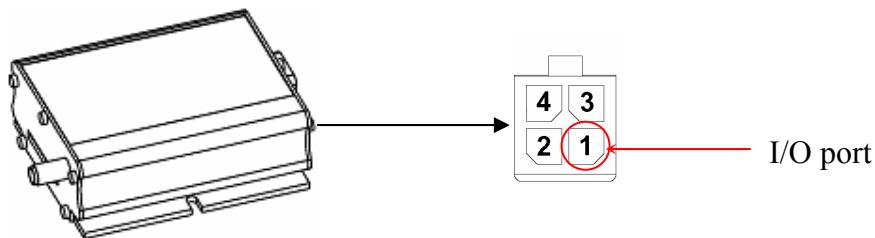
4. Always think twice before you send AT command by SMS. For example if you send AT+CPOF it will turn off the modem, and you need to go to access the modem to reset it.
5. Some VAF AT commands can be sent over SMS. See Chapter

## 7. I/O TRIGGERED AT COMMAND

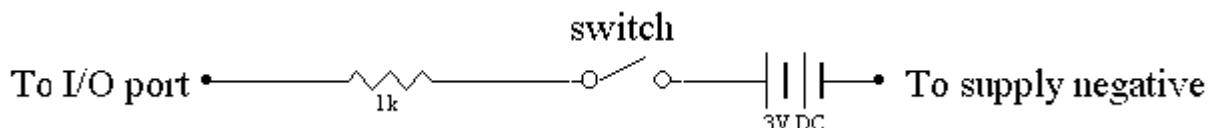
This feature making use of the Fargo Maestro Input/Output port as a sensor. If the signal to the port match the pre-defined condition a stored AT command will be executed.

User can use **AT+IOAT** command to set the condition and store AT command to be executed.

### 7.1. Description of the Operation

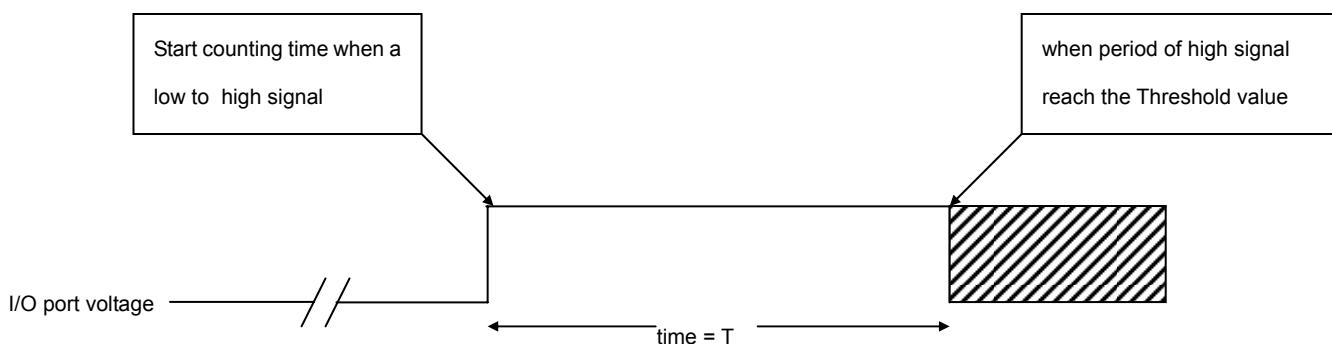


**Wiring Diagram :**

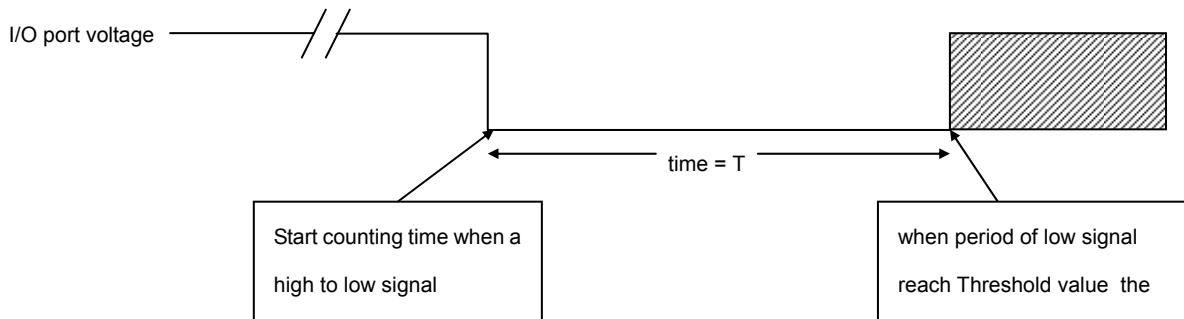


1. When the I/O port is connected to high 3V signal,  
Switch closed : logic level high  
Switch opened : logic level low.
2. The switch can be placed as a triggering device, e.g. to detect door opening.
3. According to the setting of AT+IOAT command, the stored AT command will be executed either I/O signal from high to low, or from low to high :

When set as low-to-high triggering:



When set as high-to-low triggering :



\* See **AT+IOAT** command on setting Threshold value T.

## 7.2. AT command for configuring I/O triggered AT command

### 7.2.1. AT+IOAT command

#### Command Syntax

AT+IOAT=<action>(<dir>,<Threshold>,<cmd> )

#### Response syntax:

+SMSAT: <action>,<dir>,<Threshold>,<cmd>

Command	Possible responses:
AT+IOAT=0	OK <i>Note : disable I/O triggered AT command execution</i>
AT+IOAT =1	OK <i>Enable remote I/O triggered AT command execution</i>
AT+ IOAT?	+IOAT : 1,1, 10,"AT+CMSS=5" OK <i>Note display current status</i>
AT+IOAT=2,1,10,"AT+IPR=115200"	OK <i>Note: set the parameters &lt; dir&gt;, &lt;Threshold&gt;, &lt;cmd&gt; low-to-high triggering, Threshold=1000 ms command is "AT+IPR=115200"</i>
AT+ IOAT =?	+IOAT : (0-2),(0-1),(1-50),(128) OK <i>Note : possible argument</i>

#### **Defined Values:**

##### **<action>**

- 0 disable I/O triggered AT command execution
- 1 enable I/O triggered AT command execution
- 2 configure I/O triggered AT command parameters

##### **<dir>**

- 0 configure as low-to-high triggering
- 1 configure as high-to-low triggering

## <Threshold>

Time required for the detected state to trigger the AT command exestuation. Unit is in millisecond.

Valid value from 1 to 50 (0.1 sec to 5 sec). Refer to the above timing diagram in section 5.1.

## <cmd>

AT command to be executed when the I/O port is triggered successfully. The length of the command is limited to 128 characters. See section 5.3 for more details.

## 7.3. Notes and cautions to be taken when using I/O triggered AT command

1. The I/O port is limited to drain current 10mA max. Never give too high input voltage to the I/O port or the modem will be damaged.
2. Use only cable/metal contact designed for Molex MicroFit™ connector. Using incompatible connector will damage the modem. Contact your dealer or Fargo Telecom if you need wire for the I/O port connection.
3. The modem will NOT check the command you entered to the <cmd> field. It will be executed even it is not a valid AT command (or even not an AT command). Check by yourself when you enter the command.
4. When triggered, the command will be executed in 'quiet' mode, i.e. without any response like "OK" or "ERROR" will be sent to external application.
5. Do not enter "interactive" AT command (e.g. AT+CMGS=...), otherwise when the command is executed, the modem will in a state of waiting further input, not to do other jobs.
6. With this feature enabled user cannot control the I/O port by other AT commands anymore.
7. Due to product limitation the modem cannot detect switching action with period less than 100ms. If the switch's open/close action is done in less than 100ms this feature will not be able to detect accurately.

## 8. CALL SCREENING

This feature enable the Fargo Maestro to reject incoming call if the phone number does not match one of the entries of authorized phone number list. Unauthorized incoming call will be hanged up within one ring.  
 Up to 10 authorized phone numbers can be stored. Each number can be as long as characters  
 Waiting call can also be rejected.

### 8.1. AT command for configuring call screening

#### 8.1.1. AT+CSR command

This command is to enable or disable call screening feature.

**Command Syntax:**

AT+CSR=<mode>

**Response syntax:**

+CSR: <mode>

Command	Possible responses:
AT+CSR=0	OK <i>Note : disable call screening</i>
AT+CSR=1	OK <i>Enable call screening</i>
AT+CSR?	+CSR : 1 <i>Note display current status</i>
AT+CSR=?	+CSR: (0-1) <i>Note : possible argument</i>

**Defined Values :**

**<mode>**

0 disable call screening

1 enable call screening

**Note :**

- To use call screening make sure Caller ID service is enabled otherwise all incoming call will be rejected.
- To apply call screening to waiting call please first enable Call waiting indication by command AT=CCWA=1,1
- Rejected incoming will not be diverted to voice mail.

#### 8.1.2. AT+CSNW command

This command is to enter authorized phone number.

**Command Syntax:**

AT+CSNW=<id>,<num>

**Response syntax:**

OK

Command	Possible responses:
AT+CSNW=1,"12345678"	OK <i>Note : enter authorized number to location 1</i>
AT+CSNW=11,"12345678"	+CME ERROR: 3 <i>Note : location out of range</i>
AT+CSNW=3,"1qaaa"	+CME ERROR: 3 <i>Note : non-numeric characters not allowed</i>
AT+CSNW=?	+CSRN: (1-10),(20) <i>Note : possible argument</i>

#### Defined Values :

**<id>**

Location of the authorized phone number to be stored. Valid range is from 1 to 10

**<num>**

Authorized phone number. First digit can be "+", others must be numeric digits. Maximum length is 20

#### Note :

- Enter phone number exactly same as the incoming one, especially if entering International phone number. Use AT+CLIP command to check incoming call number first.
- Enter empty phone number in the **<num>** field will erase the record of that location.

### 8.1.3. AT+CSNR command

This command is to read authorized phone number entered.

#### Command Syntax:

AT+CSNR=<id1>(<id2>)

#### Response syntax:

+CSNR: <id>,<num>....

Command	Possible responses:
AT+CSNR=1	+CSNR: 1, "12345678" OK <i>Note : display authorized number in location 1</i>
AT+CSNR=1,8	+CSNR: 1, "12345678" +CSNR: 3, "123456" +CSNR: 6, "12345678" +CSNR: 8, "12345678"  OK <i>Note : display authorized number in from location 1 to 8</i>
AT+CSNR=?	+CSNR=(1-10),(1-10) OK <i>Note: possible argument</i>

#### Defined Values :

**<id1>**

Beginning location of the authorized phone number to be read. Valid range is from 1 to 10.

**<id2>**

Ending location of the authorized phone number to be read. Valid range is from 1 to 10.

## 8.1.4. AT+CSND command

This command is to erase authorized phone number entered.

### Command Syntax:

AT+CSND=<id1>(<id2>)

### Response syntax:

+CSNR: <id>,<num>....

Command	Possible responses:
AT+CSND=1	OK <i>Note : erase authorized number in location 1</i>
AT+CSNR=1,8	OK <i>Note : erase authorized number in from location 1 to 8</i>
AT+CSND=?	+CSND=(1-10),(1-10) OK <i>Note: possible argument</i>

### Defined Values :

#### <id1>

Beginning location of the authorized phone number to be erased. Valid range is from 1 to 10.

#### <id2>

Ending location of the authorized phone number to be erased. Valid range is from 1 to 10.

## 9. KNOWN ISSUES

The Fargo Maestro Value Added Feature will affect certain other AT commands operation. Please note.

:

### 9.1. AT+WIND command

AT+WIND command will be disabled (Fargo Maestro 100 only)

### 9.2. Saving of parameters to non-volatile memory

You cannot save the settings of the following AT commands by concatenating the &W command (Fargo Maestro 100 only):

AT+CREG

AT+CGREG

AT+CGEREP

To save the above settings please enter AT&W separately.

### 9.3. Mutually exclusive TCP/UDP functions.

Following functions are exclusive to each other, i.e. if either is enabled others could not be then:

AT+AUTOTCP=1

AT+AUTOUDP=1

AT+OTCP

AT+OUDP

### 9.4. Sending VAF AT commands over SMS

You can use the remote AT command by SMS feature to send VAF AT commands mentioned in this document except the followings:

AT+OTCP

AT+OUDP

AT+IPCONNECT

## 10. QUESTIONS AND ANSWERS

### 10.1. Installation

Q. If my Fargo Maestro cannot match with the requirement stated in section 2.1, can I upgrade it?  
A. No. Older Fargo Maestro cannot be upgraded.

Q. Can I have the TCP/IP (IP connectivity) feature together with this VAF for Fargo Maestro 100?  
A. No. You can only choose one of them.

Q. If I changed my Fargo Maestro with the VAF installed, can it be changed back to have TCP/IP feature?  
A. It depends. Contact Distributor or Fargo Telecom

Q. I have downloaded the dwl file, and entered AT+WOPEN=1, but I still cannot use VAF features, why ?  
A. It could be installation problem. You can issue command AT+WOPEN=0, then AT+WOPEN=4, then repeat the download procedure. If this still not help you may need to re-flash the main firmware first.

Q. Can I disable the VAF ?  
A. Yes, you can enter AT+WOPEN=0 to disable.

Q. I get "Invalid modem" message after downloading dwl file and issuing AT+WOPEN=1. Why ?  
A. Maybe you have downloaded file into incorrect or damaged modem. Please contact Fargo Telecom.

Q. I had download incorrect dwl file, and the modem is not responding after issuing AT+WOPEN=1. What should I do ?  
A. You may need to re-flash the main firmware. Please contact Fargo Telecom or your distributor.

### 10.2. AutoTCP/UDP

Q. Can I specify <server> by URL (e.g. xxxx.com) rather than IP address?  
A. Yes, but only if your GPRS network have proper DNS service. You cannot specify your own DNS server

Q. If I enabled AutoTCP or AutoUDP, how can I stop it ?  
A. you need to enter the command **AT+AUTOTCP=0** or **AUTOUDP=0** by either 1: within 20 seconds after power up, or 2: during reconnection (serial port back to command mode), or 3: by SMS (see Chapter , SMS AT command).

### 10.3. AT command driven TCP/UDP connection

Q. Why I see three "OK" coming after entering **AT+IPCONNECT=1,1** command ?  
A. The VAF program is issuing internal AT command for GPRS setup, so extra "OK" responses will be seen.

Q. After the TCP/UDP connection is stopped I wan to enter **AT+OTCP** or **AT+OUDP** to reconnect but I get message "+CME ERROR: 3". Why ?

A. After TCP/UDP socket connection the GPRS connection session will also be disconnected. So please enter **AT+IPCONNECT=1,1** to reconnect GPRS first.

## 10.4. Remote AT command by SMS

Q. Can I send any AT command by SMS to control other features described in this document?

A. Yes. Please refer to Chapter 9.4.

## 10.5. I/O triggered AT command

Q. Can I put any AT command to control other features described in this document?

A. No. VAF AT commands described in this document cannot be executed by this feature.

## 11. Examples of VAF setup and operation

### 11.1. To setup a Automatic TCP connection

To setup Auto connect to TCP server with IP 61.167.60.1 port 23 (client mode)

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPCTP = 23,"C","61.167.60.1",100 (target TCP is 61.167.60.1, port 23, client mode, TxDelay is 100ms)	OK
AT+AUTOTCP=1 (open TCP socket connection)	OK
(TCP connection will start after 20 secs)	

To setup Auto connect to remote TCP client request with any IP address, port 23(server mode)

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPCTP = 23,"C","255.255.255.255", 100 (to accept TCP connection from any IP address, port 23, client mode, TxDelay is 100ms)	OK
AT+AUTOTCP=1 (open TCP socket connection)	OK
(Modem will start to monitor TCP port 23 after 20 secs)	

### 11.2. To make a AT command driven TCP connection

IP Connectivity (AT# feature) user can follow the following steps to make OCTP connection

To connect to TCP server with IP 61.167.60.1 port 23

Commands to be entered	Modem response	Corresponding AT# command
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK	AT#APNSERV
AT+IPCTP = 23,"C","61.167.60.1",100 (target TCP is 61.167.60.1, port 23, TxDelay is 100ms)	OK	AT#TCPSEVR AT#TCPPORT AT#TCPXTDELAY
AT+DLEMODE=1	OK	AT#DLEMODE
AT+CGATT=1	OK	AT+CGATT=1
AT+IPCONNECT=1,1 (GPRS connection)	OK OK OK	AT#CONNECTIONSTART
AT+OCTP (open TCP socket connection)	CONNECT 115200	AT#OCTP